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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/878,923	06/13/2001	Mark D. Roberts	28549/165405	2854

7590 08/22/2003
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EXAMINER

TRAN, KHANH C

ART UNIT PAPER NUMBER

2631

DATE MAILED: 08/22/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/878,923

Applicant(s)

ROBERTS, MARK D.

Examiner

Khanh Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 12.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

1. The Response to First Office action filed on 09/25/2002 has been entered.

Claims 1-52 are pending in this Office action.

Response to Arguments

2. Applicant's arguments with respect to claims 36-38 and 44-46 have been considered but are moot in view of the new ground(s) of rejection. Also, the allowance of claims 1-35 has been withdrawn in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-4, 7-11, 14-15, 17-18, 20-29, 32-33, 35, 44, 46-52 are rejected under 35 U.S.C. 102(e) as being anticipated by Wingard U.S. Patent 6,295,318 B1.

Regarding claims 1, 18 and 44, Wingard invention is directed to a method of increasing data rate of the data transmitted over a limited bandwidth medium by using a modified pulse position modulation (PPM) scheme and a synchronization signal

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transmitted over a separate-path communications channel. Figure 3 is a timing diagram illustrating the relationship between the synchronizing clock pulse (SCP) signal, the symbol positions, the pulse period, the pulse width, the frame width, and the block width. Input data signal is encoded into a PPM encoded output signal consisting of a series of n-bit pulses. Each pulse is analyzed to determine whether the pulse that is currently being transmitted is overlapped from the period of the pulse that has been transmitted previously. When overlap occurs, the receiver cannot distinguish individual pulses and the output data will be indistinguishable. Hence, signal-to-noise ratio (SNR) is degraded and data rate is reduced. To alleviate any possible overlap of two adjacent pulse periods, a pulse may be inverted. According to Wingard teachings, pulse inversion has the effect of shifting the pulse period in time to avoid overlap and provide sufficient separation between individual pulse periods of the transmitted data signal so that the receiver can distinguish successive pulse periods. Inverting the pulse to be transmitted may sufficiently shift the pulse period later in time relative to its original position in the frame to eliminate any overlap. When pulse inversion is not sufficient to eliminate overlap between the current pulse period and the previous pulse period, inserting a blank creates sufficient separation between the two successive pulse periods so that the receiver may distinguish them. Hence, inserting a blank to separate the current pulse period and the previous pulse period is equivalent to inserting a time delay as a result of an average number of coincidences as claimed in the instant application. No overlapping between successive pulse periods corresponds to the received signal quality criterion as claimed in the instant application

Regarding claims 2 and 20, as recited in claim 1, no overlapping in Wingard teachings evidently corresponds to the signal quality criterion or it means the best received signal quality.

Regarding claims 3 and 21, a blank consists of a plurality of zero-value pulses inserted at each symbol position in a frame. Hence, zero-value pulses specify total time delay between successive pulses.

Regarding claims 4, figure 3 is a timing diagram illustrating the relationship between the synchronizing clock pulse (SCP) signal, the symbol positions, the pulse period, the pulse width, the frame width, and the block width.

Regarding claims 7, 24-25 and 48-49, as recited in claim 1, pulse inversion has the effect of shifting the pulse period in time to avoid overlap and provide sufficient separation between individual pulse periods of the transmitted data signal so that the receiver can distinguish successive pulse periods. Inverting the pulse to be transmitted may sufficiently shift the pulse period later in time relative to its original position in the frame to eliminate any overlap. When pulse inversion is not sufficient to eliminate overlap between the current pulse period and the previous pulse period, inserting a blank creates sufficient separation between the two successive pulse periods so that the receiver may distinguish them.

Regarding claims 8, 26 and 50, overlapping pulses inherently cause more bit-error rate, degradation of SNR, and signal strength.

Regarding claims 9-10, 27-28 and 51-52, when overlapping occurs, inverting the pulse or inserting a blank eliminates overlap.

Regarding claims 11 and 29, inserting a blank or inverting the pulse inherently is a designed code generation technique.

Regarding claims 14 and 32, inverting a pulse when overlapping occurs inherently inserts a delay code whose delay code period is constant.

Regarding claims 15 and 33, according to Wingard teachings, the sum of time delays of a blank is inherently not equal to the time delays of inverting the pulse.

Regarding claims 17 and 35, a blank consists of a plurality of zero-value pulses, hence each of zero-value pulses has a time delay value.

Regarding claims 22 and 46, according to Wingard teachings, the number of frames is equal to the bandwidth of the system. Each frame is then divided into 2^n symbol positions. A pulse is then placed in a symbol position that corresponds to the value of the data contained in the pulse. Hence, the pulse characteristic is varied in accordance with a frame, which, in turn, depends on the bandwidth of a system.

Regarding claims 23 and 47, each frame clearly specifies a characteristic of a pulse within a frame length.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5-6, 16, 19, 34, 36-43, 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wingard U.S. Patent 6,295,318 B1 as applied to claim 4 above, and further in view of Barrett U.S. 5,610,907.

Regarding claims 5, 19, 38 and 45, Wingard does not discuss in claim 4 the time position is specified in accordance with a code element of time-hopping code. Barrett invention is directed to an RF ultrafast time hopping CDMA wireless communications system that uses individual ultrashort pulses wherein a time hopping sequential code is used to position these pulses precisely in sequence providing optimum use of time-frequency space and also providing non-interfering transmission channels due to the orthogonality of the coding schemes used. Similar to Wingard teachings, Barrett teachings exploit the ultrashort nature of individual pulses, together with orthogonal coding schemes, to permit the highest multi-channel data rates of any wireless communication system. Hence, it would have been obvious to one of ordinary skill in the art that Barrett teachings would greatly enhance Wingard invention if combined.

Regarding claims 6 and 39, according to Wingard teachings, a blank consists of a plurality of zero-value pulses inserted at each symbol position in a frame. Hence, combining with Barrett teachings, a blank corresponding to a delay code as claimed provides time delays to be inserted between two successive time-hopping code periods.

Regarding claims 16 and 34, since a blank consisting of a plurality of zero-value pulses inserted at each symbol position in a frame, a sum of the time delays of a blank is clearly greater than a code period of a time hopping code.

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Regarding claim 36, said claim is rejected using similar rejection argument of claim 1 on inserting a time delay at the transmitter. Both Wingard and Barrett teachings do not disclose the transmitter and receiver are ultra wideband system. However, RF communication systems employing ultrashort pulse time hopping CDMA would be obviously for ultra wideband applications. Therefore, it would have been obvious to one of ordinary skill in the art that the transmitter and receiver are ultra wideband systems.

Regarding claim 37, said claim is rejected using similar argument of claim 4 above.

Regarding claim 40, said claim is rejected using similar argument of claim 7 above.

Regarding claim 41, said claim is rejected using similar argument of claim 8 above.

Regarding claim 42, said claim is rejected using similar argument of claim 9 above.

Regarding claim 43, said claim is rejected using similar argument of claim 10 above.

5. Claims 12 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wingard U.S. Patent 6,295,318 B1 as applied to claims 11 and 29 above.

Regarding claims 12 and 30, Wingard do not disclose the claimed designed code generation techniques in claim 11. However, as admitted in the background of the invention of the instant application, various coding schemes such as Quadratic

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Congruential (QC) codes, Hyperbolic Congruential (HC) codes have been employed in impulse radio systems to provide a maximum limit to the number of pulse coincidences, therefore, it would have been obvious to one of ordinary skill in the art that a blank as taught by Wingard could be generated using the foregoing coding schemes.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 13 and 31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Since the Examiner rejects claim 11 based on "at least" one of the claimed features "a designed code generation technique", the rejection automatically renders the other feature invalid "a pseudorandom code generation technique" to which claim 13 depends on.

Claim Objections

7. Claim 8 is objected to because of the following informalities: in line 3, "Signal" should be changed to -- signal --. In line 4, "Bit-error-rate" should be changed to -- bit-

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error-rate --. In line 5, "Signal-to-noise" should be changed to -- signal-to-noise --. In line 6, "Spectral" should be changed to -- spectral --. Appropriate correction is required.

8. Claim 28 is objected to because of the following informalities: in line 2, "pulse trains" should be changed to -- time-varied signals --.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 703-305-2384. The examiner can normally be reached on Tuesday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 703-306-3034. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3800.

KCT

M. GL
MOHAMMAD H. GHAYOUR
PRIMARY EXAMINER